3. AFFECTED ENVIRONMENT

This chapter describes the existing resources in the project areas, presenting baseline conditions for analysis of the alternatives' impacts to them.

An introduction opens the chapter by listing the resources that will be analyzed for impacts, as well as resources that will not be analyzed. For those resources not analyzed, brief reasons are given as to why no impacts are expected. The introduction then goes on to describe environments that interrelate with IDFG Program measures, while not necessarily relating on the level of impact analysis (general descriptions of project areas, hatcheries, etc.). Affected environments follow the introduction.

3.1. INTRODUCTION

Of all these resources that could possibly be affected—both human and environmental—some clearly will be affected, and some just as clearly will not be affected. Only those resources affected by the alternatives are described in this chapter. They will be analyzed for impacts in the following chapter.

3.1.1. Resources Included and Excluded from the Analysis

Table 2: Resources Analyzed and Not Analyzed in the EA

Resource	Analyzed	Not Analyzed	Reasons
Biological	• ESA-listed spring/summer chinook salmon • ESA-listed summer steelhead • ESA-listed bull trout	1. Other anadromous species 2. Other Threatened and Endangered plant/fish/wildlife species 3. Resident fish 4. Wildlife	1. No other anadromous species are in the project areas. 2. Section 7 consultation identifies the bald eagle (*Haliaeetus leucocephalus*) as endangered (50 CFR 17.11) and present in the affected area. Low-impact, short-term IDFG Program measures would create very minor disturbance to this species' habitat. 3. IDFG Program activities in project areas are confined to developed roads and/or maintained trails. Work periods are short term, and installed equipment

Resource	Analyzed	Not Analyzed	Reasons
			is temporary. There would be only minor, temporary disturbance to resident fish and/or wildlife.
Physical/Environmental	• Floodplains and wetlands • Water quantity/quality • Visual quality	1. Soils 2. Air quality	IDFG Program activities in project areas are low impact and short term, and would not affect soils or air quality.
Human	• Cultural and historic resources • Social and economic *(cumulative impacts only; see Reasons, Human, #1)*	1. Land use 2. Social and economic	1. Small-scale project work would have no widespread, deep, or lasting short-term impact on local social or economic patterns. 2. Brief IDFG Program work periods and temporary installed equipment would not disturb land-use patterns on public or private lands.

3.1.2. IDFG Project Areas

The Salmon River is a major tributary to the Snake River, watering central Idaho. The East Fork Salmon River, the West Fork Yankee Fork, and the Lemhi River are tributary to the Salmon River. These rivers compose the project area for the proposed IDFG Program *(see Figures 1-1, 1-2, and 1-3, following page 4)*.

The East Fork Salmon River is located 552 river kilometers (RK) (345 river miles [RM]) upstream from the mouth of the Salmon River, which has its confluence with the East Fork Salmon River near the town of Clayton. The East Fork Salmon River drains granitic parent material, and is generally less productive than the Lemhi River system.

The IDFG once operated a velocity barrier weir on the East Fork Salmon River (it has not been operated in recent years). The study area ranges from the velocity barrier weir site upstream to the headwaters of the East Fork Salmon River.

The West Fork Yankee Fork Salmon River is located 591 RK (369 RM) upstream from the mouth of the Salmon River. The confluence of the West Fork Yankee Fork and Yankee Fork is located 11 RK (6.8 RM) upstream of the mouth of the Yankee Fork near the one-time mining community of Bonanza. The West Fork Yankee Fork drains granitic parent material adjacent to the Frank Church Wilderness. The majority of

chinook salmon spawning occurs between the tributaries of Lightening and Cabin Creeks.

The Lemhi River confluence with the Salmon River is located 416 RK (260 RM) upstream from the mouth of the Salmon River near the town of Salmon. The mouth of Hayden Creek is located approximately 32 RK (20 RM) upstream from the mouth of the Lemhi River. The confluence of Bear Valley Creek is an additional 12 RK (7.5 RM) upstream on Hayden Creek. The Lemhi River drains productive basaltic parent material resulting in rapid fish growth. The primary study area for evaluations of captive release spawning is in ***Bear Valley Creek*** where the fish would be restricted to a meandering meadow of approximately 2.5 RK (1.5 RM) in length.

Alternative adult release site: Big Springs Creek: ***Big Springs Creek*** originates from a series of springs a short distance north of Leadore. It flows north for 4.8 to 8 km (3 to 5 miles), paralleling the Lemhi River. Geophysically and topographically, the area resembles the Lemhi River.

3.1.3. Hatchery Facilities

IDFG Program managers would use three existing artificial propagation and rearing facilities. The Sawtooth Fish Hatchery located on the Salmon River in the Stanley Basin, Idaho, would provide facilities for initial holding of eyed eggs (or parr). Eyed eggs or parr would then be transferred for freshwater rearing at Eagle Fish Hatchery, near Boise, Idaho (approximately 20 percent of the sample), or to the NMFS Manchester Marine Experimental Station (Puget Sound, Washington) for saltwater rearing (approximately 80 percent of the sample).

3.1.4. In-stream Fish Species Profile

Anadromous fish include natural and hatchery-produced spring/summer chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*Oncorhynchus mykiss*).

Resident fish include bull trout (*Salvelinus confluentus*), cutthroat trout (*O. clarki*), northern squawfish (*Ptychocheilus oregonensis*), redside shiner (*Richardsonius balteatus*), sculpin (*Cottus spp*.), dace (*Rhinichthys spp*.), suckers (*Catostomus spp*.), rainbow trout (*O. mykiss*), mountain whitefish (*Prosopium williamsoni*), and brook trout (*S. fontinalis*).

3.2. ANADROMOUS SALMONIDS

3.2.1. Salmon River Spring/Summer Chinook Salmon (*O. tshawytscha*)

The Salmon River is the single most important spring/summer chinook salmon spawning stream in the Snake River Basin (Mallet 1974). Historically, 50 percent of Idaho's summer chinook salmon redds were identified in the Salmon River, and currently, 28 of the 38 local spawning populations in the Snake River ESU exist in the Salmon River drainage.

Important Salmon River spawning areas are located over 1,440 km (900 miles) inland, typically at elevations around 1,212 meters (4,000 feet) above sea level. Few chinook salmon within the entire range of the species spawn farther from the ocean, and none spawn at higher elevations. Most spring/summer chinook salmon enter individual subbasins from May through September. Hatchlings emerge from the spawning gravels from June through February (Perry and Bjornn 1991). Typically, after rearing in their nursery streams for about one year, smolts begin migrating seaward in April and May (Bugert et al. 1990; Cannamela 1992). After reaching the mouth of the Columbia River, spring/summer chinook salmon probably inhabit nearshore areas before beginning their northeast Pacific Ocean migration, which lasts 2 to 3 years.

3.2.2. Snake River Basin Steelhead (*O. mykiss*)

Of two identified races of steelhead (summer steelhead and winter steelhead), only summer steelhead inhabit the Snake River Basin. Two distinct stocks of summer steelhead are identified as A-run and B-run steelhead. A-run and B-run are defined based on timing of their respective adult migrations, ocean age, and size at maturity. Four phases of **life history** characterize all races and stocks of steelhead: freshwater spawning and rearing; juvenile migration to the ocean; ocean residence; and adult upriver migration.

Snake River Basin steelhead enter fresh water from June to October and spawn in the following spring from March to May. Summer steelhead in the Snake River Basin typically spawn high in the upper mainstems of the larger rivers and in small tributaries. Steelhead will spawn in smaller and higher gradient tributaries than chinook generally choose. Also, as spring spawners, they spawn when streamflows are generally higher and smaller streams are more accessible (NMFS 1999).

A-run females lay an average of 3,500 eggs in small to medium gravel. After emerging from the redds in April to June, juveniles remain in streams and rivers. Juvenile steelhead have a variety of migration patterns that vary with local conditions. Control mechanisms range from mostly genetic to mostly environmental (Behnke 1992). Following 1 to 2 years' rearing instream, A-run steelhead migrate to the ocean during March to June (Bell 1986). A-run steelhead generally remain in the ocean 1 year before returning to spawn (IDFG 1994). They are a smaller, earlier-returning stock than B-run steelhead, which generally return following 2 years.

A-run steelhead are found in all study areas and are the species of concern due to possible species interactions with target spring/summer chinook populations. The East Fork Salmon River also has a small population of B-run steelhead, which was introduced several years ago and is now established. Snake River and Upper and Lower Columbia Rivers steelhead populations were listed as threatened by NMFS on August 18, 1997 (62 FR 43937).

3.2.3. Snake River Basin Bull Trout (*Salvelinus confluentus*)

Bull trout spawn from late August through late September, typically at elevations of around 1,818 meters (6,000 feet). Hatching may occur in winter or early spring, but

alevins may stay in the gravel for an extended period after yolk absorption (United States Fish and Wildlife Service [USFWS] 1998). Juvenile fish rear from 1 to 4 years before migrating to a river where they mature. Resident and migratory forms are sometimes found together, and individual bull trout may give rise to offspring exhibiting either resident or migratory behavior.

The USFWS designated Columbia River distinct population segments of bull trout as threatened, effective July 10, 1998. No critical habitat has been designated for this species (USFWS 1998). All project areas, including the adult release alternative (Big Springs Creek), contain bull trout.

3.3. FLOODPLAINS AND WETLANDS

The East Fork Salmon River and the West Fork Yankee Fork Salmon River are both free-flowing streams transitioning from mountain foothills to river bottom in the project areas. Upper elevations are bounded by steep-sided canyons, with streamside vegetation characterized by evergreen. Lower elevations flatten out, presenting willow-type streamside vegetation, with seasonal wetlands within reach of the floodplain.

The Bear Valley Creek tributary of the Lemhi River was an historic salmon and steelhead spawning area. Sections of the stream on reduced gradients are riverbottom-like with willow-type riparian zones. Large beaver-created wetlands were historically present in some stretches. The beaver were trapped out in the late 1970s, leading to degradation of the wetlands (Bruce Smith, biologist, USFS, Salmon-Challis National Forest, personal communication, May 31, 2000).

The alternative adult release site at Big Springs Creek originates just north of the town of Leadore, within the Lemhi Valley. The Lemhi Valley is relatively broad and flat at this point. Big Springs Creek is bounded by agricultural areas. There are seasonal wetlands within the alluvial plain. Due to cattle grazing, riparian vegetation is sparse downstream.

3.4. WATER QUALITY AND QUANTITY

Water quality within all project areas is typically pristine in the higher elevations. Within alluvial plains, water quality is degraded by agriculture and grazing, which create some sedimentation. Water quantity is adequate at all sites, although irrigation water withdrawals at Bear Valley Creek have, in the past, dewatered parts of the stream. These withdrawals have ceased.

3.5. VISUAL QUALITY

Visually, floodplains present open vistas containing either cultivated areas on private lands or alluvial plains and associated vegetation on USFS-owned and -managed land. At the higher elevations, streams are free flowing through foothills transitioning to pristine, forested canyons. Visual Quality Standards on USFS-managed lands are "partial retention," meaning that foreground views of project areas should be preserved.

3.6. CULTURAL AND HISTORIC RESOURCES

The Salmon-Challis National Forest, parts of which contain project areas, is in the process of being surveyed for cultural and historic resources. The East Fork Salmon River and West Fork Yankee Fork Salmon River likely contain prehistoric camps and fishing sites, as well as historic mining sites.

Traditional prehistoric fishing sites are known to exist along the Bear Valley Creek tributary to the Lemhi River, with prehistoric campsites on the terraces above the river. Historic USFS trails follow the creek along each bank (Steve Matz, archeologist, USFS, Salmon-Challis National Forest, personal communication, May 31, 2000).

4. ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES

This chapter discusses the potential impacts to affected environments from the alternatives. Sections of the chapter are organized by affected environments, i.e., ESA-listed Anadromous Fish; Floodplains and Wetlands; Water Quantity and Quality; Visual Quality; and Cultural Resources. The chapter also describes impacts from the No Action Alternative, and cumulative impacts from the alternatives.

4.1. SUMMARY OF POTENTIAL IMPACTS FROM THE ALTERNATIVES

Table 3: Summary Table - Comparison of Potential Impacts

Resource	Existing Conditions	Impacts of Proposed Action	Impacts of Alternative One: Parr Collection	Impacts of Alternative Two: Big Springs Creek Adult Release	Impacts of No Action Alternative
Anadromous Fish 1. Spring/summer chinook salmon 2. Summer steelhead 3. Bull Trout	1. Listed. High-priority local populations in project areas. 2. Listed. Present in project areas. 3. Listed. Present in project areas.	1. IDFG Program activities would remove broodstock from local populations. If the IDFG Program works, it will return more sexually mature adults than it removes, having a net positive impact on at-risk populations. If the IDFG Program does not work, it could hasten extirpation.	1. Overall, this alternative would have a net positive impact, should the IDFG Program work *(see previous column)*. If not, could hasten extirpation of target populations. This alternative may impair overall effectiveness of	Same as the Proposed Action for all anadromous species.	1. No action would most likely result -in– although not cause– extirpation of target spring/summer chinook salmon local populations. 2. No impacts. 3. No impacts.